Brit. J. vener. Dis. (1958), **34**, 22.

THE TREPONEMATOSES — OR TREPONEMATOSIS?*†

BY

ELLIS HERNDON HUDSON

Cedar Grove, Wisconsin, U.S.A.

Treponematosis probably originated in the hot humid region of Central Africa. It would be under such climatic conditions that one would expect a saprophytic spirochaete first to penetrate the human skin. This did not happen within the memory of man, nor within the period of recorded history. Treponematosis is endemic in the most primitive and sedentary tribes of Africa; not only do they have no tradition relating to the introduction or the origin of the disease, but the infection is embedded in their oldest customs and languages. It is possible to assume that treponematosis has been a disease of man in Africa for several hundred thousand years.

Africa was the source of human migration during the paleolithic period, approximately 100,000 years ago. At that time the Protonegroid wave passed eastward through the warm regions of Asia, Australia, and Oceania. Identity of the distant and isolated treponematosis of the Pacific Islands with that of Central Africa strongly suggests that migration was responsible for carrying the infection eastwards from its original home.

The modern counterpart of this ancient treponematosis is yaws. Wherever this name is used it suggests a disease of prehistoric origin, never diverging far from the presumptive prototype in Africa. It is a disease of childhood, propagated under the unhygienic conditions of primitive village life. The basic element in the epidemiology is transfer of treponemes from the skin of one person to that of another. In the absence of isolation and treatment, the whole community is infected —usually early in life—and the parasite has become, in a sense, domesticated.

Human migrations went north from Africa as well as east. In the Mediterranean countries village life was sufficiently primitive in prehistoric times for the childhood propagation of treponematosis. The modern counterpart of this phase is endemic syphilis, as seen in Syria, Iraq, Turkey, Yugoslavia, and elsewhere. There *are* differences between endemic syphilis and yaws, but these can be explained by factors of climate and human customs. In general, the disease operates on a narrower margin in the temperate zone, hampered by the restrictions of clothing and of a less hot and humid climate. In endemic syphilis, the basic element in the epidemiology is the transfer of treponemes from mucous patches in the mouth of one person to the mouth of another.

As long as people lived in caves and primitive villages, treponematosis was of the nature of yaws and its daughter, endemic syphilis. Up to 10,000 years ago, groups of people living together did not number more than a few hundred. It was not until 4 or 5,000 years ago that cities began to appear. The techniques of urban existence are a relatively recent acquisition, among them, water supply and sanitary disposal, and defences against the diseases of crowding, such as typhoid and typhus, cholera, plague, and smallpox.

Paradoxically, one village disease died out at the city gate. Because of the better organization of the house and family, better clothing and nutrition, care and isolation of the sick, and better personal hygiene, childhood treponematosis was made epidemiologically impossible in the town. However, urban life was opening the door to a new epidemiology, the basic element of which was the transfer of treponemes from genital to genital. This modern phase of treponematosis is called sporadic or venereal syphilis. It carries with it something of the skin-to-skin transfer of grandmother yaws, and something of the mouth-to-mouth transfer of mother endemic syphilis, but relies chiefly on sexual contact.

These three therefore represent the reaction between man and the treponeme under three

*Received for publication October 21, 1957.

†Read at the First International Symposium on Venereal Diseases and the Treponematoses, May 30, 1956, Washington, D.C.
Abstracted from "Non-Venereal Syphilis, A Sociological and Medical Study of Bejel". By E. H. Hudson, 1958. Livingstone, Edinburgh.

different environmental patterns. They are evolutionary phases of one disease; all are found in the world to-day, in the geographical distribution appropriate to the epidemiological pattern presented by the inhabitants of each region.

Parsimony in diagnosis bars the indiscriminate multiplication of disease names. If the epidemiological factors alone account for differences between certain disease conditions, they should be regarded as one disease. Epidemiology is the crucial factor in the differentiation between yaws, endemic syphilis, and venereal syphilis. As time passes, it becomes increasingly clear that there is no qualitative difference between the three phases of treponematosis in respect to their serology, pathology, or response to therapy.

As to the treponemes themselves, intensive research and the most modern techniques have failed to establish any qualitative difference between the three spirochaetes. Such differences as have appeared are quantitative and relative, such as characterize the strains or varieties of one species.

Since the one species, *Treponema pallidum*, is to the best of our present knowledge responsible for all three phases of treponematosis, and since one species of parasite cannot produce more than one disease, it follows that yaws, endemic syphilis, and venereal syphilis are clinical variations of one disease.

Biologically, the case could hardly be otherwise. According to Sir Charles Darwin, it takes up to a million years or more for the gradual evolutionary creation of a new species, yet the "venereal" treponeme has only appeared within the last 10,000 years. *Sudden* mutation is the only other method by which new species arise, but there is no evidence that in a given place at a given time a treponeme suddenly appeared with a tropism for the genitalia. On the contrary, each country has developed its own "venereal" treponeme as it developed the complex social fabric of urban life. The progression from primitive childhood treponematosis to the sophisticated adult venereal form has been noted in many countries as hygiene, civic improvement, and industrialization have encroached on primitive cultures.

If yaws, endemic syphilis, and sporadic syphilis are then epidemiological phases of one world-wide disease, the use of the singular noun—treponemato*sis*—would be appropriate. In the older tradition of medicine, *clinical* differences were used as criteria of nomenclature and diagnosis, and epidemiological considerations were often permitted to intrude. Many people still feel that yaws and syphilis *look* so different that it is difficult to think of them as epidemiological phases of one disease. The present medical generation accustomed to nomenclature and diagnosis based upon aetiology, is not disconcerted to find that the behaviour of a disease in the African bush is different from its behaviour in the sophisticated circles of Europe and America.

When the world was divided on the basis of civilized and primitive cultures, it used to be convenient to distinguish between syphilis and the "yaws of the natives". Historically, medical attention was first focused on the problems of venereal syphilis, actually the last phase in the evolutionary cycle. The spirochaete was discovered and named in its venereal setting, a newcomer derived but lately from a long line of ancient non-venereal ancestors.

However, with the world now so much smaller in terms of time and space, and with medical attention attracted to health problems of great underdeveloped regions of the world, yaws has now moved into the spotlight. This process has been hastened by the dramatic success of penicillin, and the subsequent relative decline of venereal syphilis as a major problem of western culture. In modern medicine the pragmatic argument of usefulness and convenience which formerly separated syphilis and yaws, is reversing itself as the advantages of unification become apparent. If we survey treponematosis as a whole, its immense bulk is impressive, not so much for the diversity of its superficial features as for the essential uniformity of its texture.

Opposition to the unitary concept has softened to a tolerant attitude, expressed by the use of the word treponematos*es*, in the apparent hope that the use of the plural will avoid argument. Some use the endings *is* and *es* interchangeably on the ground that yaws and syphilis are treated with the same agents, so that it does not matter whether the parasites are of the same or different species.

While sympathizing with this point of view, one may doubt its long-term wisdom. The international medical organizations are stressing research and treatment of treponematosis throughout the world, while referring to its component parts as the treponematos*es*. The plural term is divisive; the impact of the singular noun upon the thinking of the workers in this field would be advantageous. The names syphilis and yaws have valuable clinical meanings and must be retained, but there is no longer a place for compartmental thinking. Wherever there is syphilis or yaws in the world there is a treponematosis problem. A simple terminology is required which affirms that the anti-treponematosis campaign is a world-wide fight against an old and versatile parasite.